Java Programming Course

JSON Processing with Java

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Session objectives

JSON Introduction
JSON structure
Java API for JSON Processing

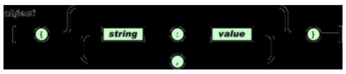
JSON Introduction

http://www.json.org/

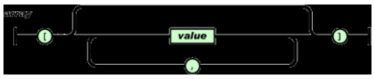
“
- **JSON** (JavaScript Object Notation) is a lightweight data-interchange format.
  - It is easy for humans to read and write.
  - It is easy for machines to parse and generate.
  - It is based on a subset of the JavaScript Programming Language, Standard ECMA-262 3rd Edition - December 1999.
  - JSON is a text format that is completely language independent but uses conventions that are familiar to programmers of the C-family of languages, including C, C++, C#, Java, JavaScript, Perl, Python, and many others. These properties make JSON an ideal data-interchange language.
- JSON is built on two structures:
  - A collection of name/value pairs. In various languages, this is realized as an *object*, record, struct, dictionary, hash table, keyed list, or associative array.
  - An ordered list of values. In most languages, this is realized as an *array*, vector, list, or sequence.
”

JSON structure (1)

- In JSON, they take on these forms:
  - An *object* is an unordered set of name/value pairs. An object begins with { (left brace) and ends with } (right brace). Each name is followed by : (colon) and the name/value pairs are separated by , (comma).

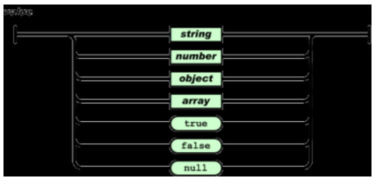


  - An *array* is an ordered collection of values. An array begins with [(left bracket) and ends with] (right bracket). Values are separated by , (comma).



JSON structure (2)

- A value can be a *string* in double quotes, or a *number*, or true or false or null, or an *object* or an *array*. These structures can be nested.



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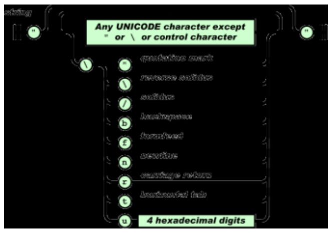
JSON structure (3)

- A string is a sequence of zero or more Unicode characters, wrapped in double quotes, using backslash escapes. A character is represented as a single character string. A string is very much like a C or Java string.



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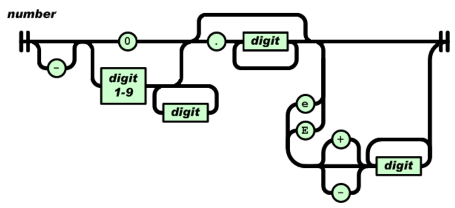
JSON structure (4)

- A number is very much like a C or Java number, except that the octal and hexadecimal formats are not used.



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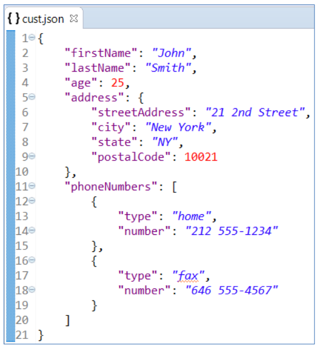
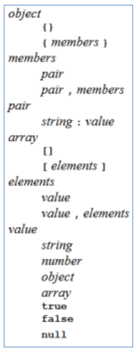
Sample json document & rule


{ } cust.json

```
{
    "firstName": "John",
    "lastName": "Smith",
    "age": 25,
    "address": {
        "streetAddress": "21 2nd Street",
        "city": "New York",
        "state": "NY",
        "postalCode": 10021
    },
    "phoneNumbers": [
        {
            "type": "home",
            "number": "212 555-1234"
        },
        {
            "type": "fax",
            "number": "646 555-4567"
        }
    ]
}
```



```
object
        {}
        { members }
members
        pair
        pair , members
pair
        string : value
array
        []
        [ elements ]
elements
        value
        value , elements
value
        string
        number
        object
        array
        true
        false
        null
```

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Java API for JSON Processing

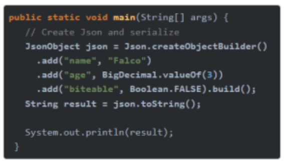
- JSR 374 Specification
- JSON Processing (JSON-P) is a Java API to process (for e.g. parse, generate, transform and query) JSON messages.
- It produces and consumes JSON text in a streaming fashion (similar to StAX API for XML) and allows to build a Java object model for JSON text using API classes (similar to DOM API for XML).

Mapping between JSON and Java entities

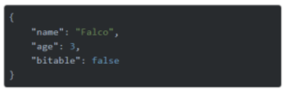
JSON	Java
string	java.lang.String
number	java.lang.Number
true|false	java.lang.Boolean
null	null
array	java.util.List
object	java.util.Map

On decoding:
The default concrete class of *java.util.List* is *org.json.simple.JSONArray*
The default concrete class of *java.util.Map* is *org.json.simple.JSONObject*.

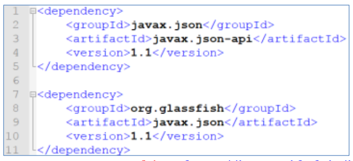
Encoding JSON in Java



```
public static void main(String[] args) {
   // Create Json and serialize
   JsonObject json = Json.createObjectBuilder()
     .add("name", "Falco")
     .add("age", BigDecimal.valueOf(3))
     .add("biteable", Boolean.FALSE).build();
   String result = json.toString();

   System.out.println(result);
 }
```

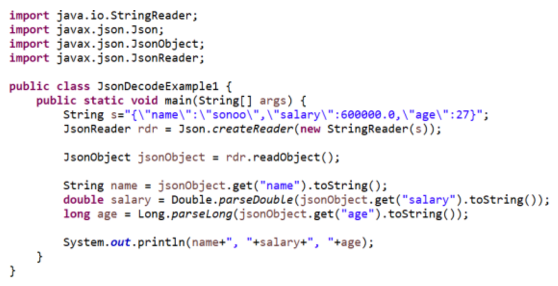


```
{
    "name": "Falco",
    "age": 3,
    "bitable": false
}
```



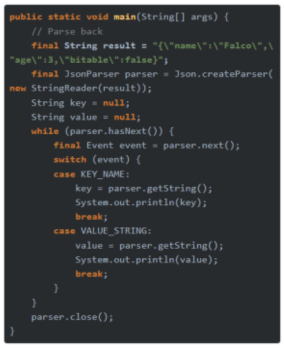
```
<dependency>
    <groupId>javax.json</groupId>
    <artifactId>javax.json-api</artifactId>
    <version>1.1</version>
</dependency>

<dependency>
    <groupId>org.glassfish</groupId>
    <artifactId>javax.json</artifactId>
    <version>1.1</version>
</dependency>
```

driver: https://javaee.github.io/jsonp/



```
import java.io.StringReader;
import javax.json.Json;
import javax.json.JsonObject;
import javax.json.JsonReader;

public class JsonDecodeExample1 {
    public static void main(String[] args) {
        String s="{\"name\":\"sonoo\",\"salary\":600000.0,\"age\":27}";
        JsonReader rdr = Json.createReader(new StringReader(s));

        JsonObject jsonObject = rdr.readObject();

        String name = jsonObject.get("name").toString();
        double salary = Double.parseDouble(jsonObject.get("salary").toString());
        long age = Long.parseLong(jsonObject.get("age").toString());

        System.out.println(name+", "+salary+", "+age);
    }
}
```

Decoding JSON in Java – Stream API



```
public static void main(String[] args) {
    // Parse back
    final String result = "{\"name\":\"Falco\",\
"age\":3,\"bitable\":false}";
    final JsonParser parser = Json.createParser(
new StringReader(result));
    String key = null;
    String value = null;
    while (parser.hasNext()) {
        final Event event = parser.next();
        switch (event) {
        case KEY_NAME:
            key = parser.getString();
            System.out.println(key);
            break;
        case VALUE_STRING:
            value = parser.getString();
            System.out.println(value);
            break;
        }
    }
    parser.close();
}
```

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FAQ

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That's all for this session!

Thank you all for your attention and patient !

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